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Formation of closed mesopores in boehmite during the phase transformation of gibbsite under hydrothermal conditions

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Abstract

We report a study of the phase transformation of gibbsite-boehmite under hydrothermal treatment in aqueous suspension and under the "dry steam" conditions at T = 180–210 °C and P = 1.0–1.9 MPa for 30–540 min. It is the first time that the closed mesopores formed during the splicing of large crystals in which water is encapsulated in an amount of up to 1.8% of the masses are found in boehmite. The spread of closed mesopores by the diameters depends on the conditions of hydrothermal treatment: in the aqueous suspension the mesopores are of the diameters less than 4 nm, under conditions of "dry steam"—in the range of 4–6 nm and ~ 10–200 nm. With those closed mesopores, it possible to use boehmite in various fields of chemistry and technology for the encapsulation and transport of solutions containing the active components and connections.

Keywords γ-Alumina · Boehmite · Gibbsite · Hydrothermal treatment · Heat treatment

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